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U.S. Department of the Interior • U.S. Geological Survey

# MINERAL INDUSTRY SURVEYS

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## COBALT IN NOVEMBER 1996

U.S. consumption of cobalt during January through November 1996 was basically the same as consumption during the first 11 months of 1995, according to the U.S. Geological Survey (USGS). U.S. imports of cobalt metal and cobalt contained in chemicals during January through October 1996 were basically the same as imports during the first 10 months of 1995. Exports of unwrought cobalt and cobalt contained in chemicals were 27% higher in January through October 1996 than during the same period in 1995. Trade data for November will be available in a subsequent issue.

### Note

With the exception of prices, all data in this report have been rounded to no more than three significant digits. Totals and percentages were calculated using unrounded data. Domestic

data on U.S. cobalt consumption and stocks are developed by the USGS from voluntary surveys of U.S. operations. The data in tables 1 through 3 contain estimates to account for nonrespondents and are subject to revision.

Price update, dollars per pound of electrolytic cobalt  
(Source--Platt's Metals Week):

| <u>Week ending</u>    | <u>Price range</u> |
|-----------------------|--------------------|
| Jan. 17               | 22.25-22.25        |
| <u>Annual average</u> |                    |
| 1996                  |                    |
| 25.50                 |                    |

TABLE 1  
U.S. REPORTED CONSUMPTION OF COBALT MATERIALS 1/

(Metric tons, contained cobalt)

| Period              | Metal 2/ | Oxide and<br>other chemical<br>compounds 3/ | Scrap | Total  |
|---------------------|----------|---|-------|--------|
| 1995:               |          |   |       |        |
| November            | 282      | 119   | 133   | 533    |
| December            | 250      | 137   | 130   | 517    |
| January-November r/ | 2,950    | 1,550                                       | 1,410 | 5,910  |
| January-December 4/ | 3,200    | 1,690                                       | 1,540 | 6,430  |
| Year 5/             | 3,660    | 1,800                                       | 1,540 | 7,000  |
| 1996:               |          |   |       |        |
| January             | 291      | 145   | 132   | 569    |
| February            | 265      | 148   | 124   | 537    |
| March               | 279      | 129   | 133   | 541    |
| April               | 268      | 129   | 125   | 522    |
| May                 | 295      | 136   | 128   | 560    |
| June                | 259      | 135   | 136   | 530    |
| July                | 262      | 151   | 129   | 542    |
| August              | 292 r/   | 136   | 132   | 559 r/ |
| September           | 277 r/   | 133   | 136   | 545 r/ |
| October             | 275 r/   | 138 r/                                      | 138   | 550 r/ |
| November            | 268      | 126   | 136   | 530    |
| January-November    | 3,030    | 1,510                                       | 1,450 | 5,990  |

r/ Revised.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes metal powder.

3/ Data may include other cobalt materials.

4/ Data based on monthly reports.

5/ Includes annual reports.

TABLE 2  
U.S. REPORTED CONSUMPTION OF COBALT, BY END USE 1/

(Metric tons, contained cobalt)

| End use   | 1995                 |                         |         | 1996     |                      |
|---|----------------------|-------------------------|---------|----------|----------------------|
|   | January-<br>November | January-<br>December 2/ | Year 3/ | November | January-<br>November |
| Steel:  |                      |                         |         |          |                      |
| Stainless and heat resisting                      | 35 r/                | 38                      | 38      | 3        | 35                   |
| Tool  | W                    | W                       | 146     | W        | W                    |
| Superalloys                                       | 2,440 r/             | 2,650                   | 2,940   | 231      | 2,550                |
| Alloys (excludes steels and superalloys):         |                      |                         |         |          |                      |
| Magnetic alloys                                   | 637 r/               | 698                     | 757     | 58       | 626                  |
| Welding materials (structural and hard-facing) 4/ | 245                  | 264                     | 287     | 22       | 249                  |
| Other alloys 5/                                   | 55 r/                | 59                      | 80      | 4        | 52                   |
| Cemented carbides 6/                              | 693 r/               | 746                     | 748     | 68       | 727                  |
| Chemical and ceramic uses:                        |                      |                         |         |          |                      |
| Catalysts   | 655 r/               | 713                     | 732     | 53       | 603                  |
| Driers in paints or related usage                 | 711 r/               | 770                     | 770     | 45       | 626                  |
| Ground coat frit                                  | 155                  | 172                     | 172     | 21       | 209                  |
| Pigments  | W                    | W                       | 172     | W        | W                    |
| Miscellaneous and unspecified 7/                  | 281 r/               | 311                     | 163     | 24       | 310                  |
| Total   | 5,910 r/             | 6,430                   | 7,000   | 530      | 5,990                |

r/ Revised. W Withheld to avoid disclosing company proprietary data; included in "Miscellaneous and unspecified."

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Data based on monthly reports.

3/ Includes annual reports.

4/ Includes wear-resistant alloys.

5/ Includes nonferrous alloys.

6/ Includes diamond bit matrices, cemented and sintered carbides, and cast carbide dies or parts.

7/ Includes feed or nutritive additive, full-alloy steel, glass decolorizer, mill products made from metal powder, and data indicated by the symbol "W."

TABLE 3  
U.S. REPORTED STOCKS OF COBALT MATERIALS 1/

(Metric tons, contained cobalt)

|             | Industry 2/                                 |        |       |          | U. S.<br>Government 3/ |
|-------------|---|--------|-------|----------|------------------------|
|             | Oxide and<br>other chemical<br>compounds 5/ |        |       | Total    | Metal                  |
|             | Metal 4/                                    |        | Scrap |          |                        |
| 1995:       |   |        |       |          |                        |
| November    | 249   | 317    | 103   | 669      | 20,800                 |
| December 6/ | 323   | 283    | 103   | 709      | 20,700                 |
| Yearend 7/  | 390   | 309    | 103   | 802      | 20,700                 |
| 1996:       |   |        |       |          |                        |
| January     | 310 r/                                      | 320    | 135   | 764      | 20,700                 |
| February    | 275   | 300    | 150   | 725      | 20,700                 |
| March       | 273 r/                                      | 702    | 152   | 1,130    | 20,400                 |
| April       | 277   | 699    | 138   | 1,110    | 20,100                 |
| May         | 258   | 694    | 138   | 1,090    | 19,800                 |
| June        | 234 r/                                      | 695    | 99    | 1,030    | 19,600                 |
| July        | 253 r/                                      | 695    | 99    | 1,050 r/ | 19,500                 |
| August      | 372 8/                                      | 416 8/ | 96    | 884 r/   | 19,300                 |
| September   | 347 r/                                      | 299    | 98    | 745 r/   | 19,000                 |
| October     | 335 r/                                      | 301    | 101   | 737 r/   | 18,900                 |
| November    | 346   | 317    | 102   | 765      | 18,800                 |

r/ Revised.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Stocks reported by cobalt processors and consumers.

3/ Data from Defense Logistics Agency, Defense National Stockpile Center. Includes material committed for sale pending shipment.

4/ Includes metal powder.

5/ Data may include other cobalt materials.

6/ Data based on monthly reports.

7/ Includes annual reports.

8/ Data being questioned.

TABLE 4  
U.S. IMPORTS FOR CONSUMPTION OF COBALT, BY COUNTRY 1/

(Kilograms, gross weight of material, except as noted)

| Period and country<br>of origin | Metals 2/  |               | Oxides and hydroxides |              | Salts and compounds 3/ |              | Total cobalt<br>content for<br>the month 5/ | Cobalt<br>content,<br>year to<br>date 5/ 6/ |
|---------------------------------|------------|---------------|-----------------------|--------------|------------------------|--------------|---|---|
|                                 | Quantity   | Value 4/      | Quantity              | Value 4/     | Quantity               | Value 4/     |   |   |
| 1995:                           |            |               |                       |              |                        |              |   |   |
| October                         | 531,000    | \$31,700,000  | 29,700                | \$1,310,000  | 110,000                | \$1,420,000  | 583,000                                     | 5,680,000                                   |
| November                        | 259,000    | 16,200,000    | 58,900                | 2,780,000    | 98,800                 | 1,350,000    | 328,000                                     | 6,010,000                                   |
| December                        | 411,000    | 25,900,000    | 16,300                | 722,000      | 16,000                 | 189,000      | 427,000                                     | 6,440,000                                   |
| January-December                | 5,530,000  | 325,000,000   | 808,000               | 34,300,000   | 1,170,000              | 15,800,000   | 6,440,000                                   | XX  |
| 1996:                           |            |               |                       |              |                        |              |   |   |
| January                         | 515,000    | 30,000,000    | 53,000 7/             | 2,060,000 7/ | 276,000 7/             | 3,480,000 7/ | 627,000                                     | 627,000                                     |
| February                        | 470,000    | 29,900,000    | 57,100                | 2,810,000    | 25,600 7/              | 314,000 7/   | 519,000                                     | 1,150,000                                   |
| March                           | 540,000    | 36,000,000    | 49,800 7/             | 2,450,000 7/ | 183,000 7/             | 2,300,000 7/ | 626,000                                     | 1,770,000                                   |
| April                           | 432,000    | 27,500,000    | 147,000               | 6,370,000    | 104,000                | 1,340,000    | 566,000                                     | 2,340,000                                   |
| May                             | 457,000    | 27,500,000    | 62,100                | 2,730,000    | 55,200                 | 786,000      | 515,000                                     | 2,850,000                                   |
| June                            | 606,000 7/ | 36,000,000 7/ | 82,200                | 3,710,000    | 88,800                 | 1,170,000    | 689,000                                     | 3,540,000                                   |
| July                            | 571,000    | 33,000,000    | 93,900                | 4,440,000    | 60,200                 | 778,000      | 655,000                                     | 4,200,000                                   |
| August                          | 480,000    | 24,800,000    | 112,000 7/            | 2,160,000 7/ | 38,600                 | 405,000      | 571,000                                     | 4,770,000                                   |
| September                       | 432,000 7/ | 20,500,000 7/ | 58,600                | 2,440,000    | 101,000                | 954,000      | 502,000                                     | 5,270,000                                   |
| October:                        |            |               |                       |              |                        |              |   |   |
| Australia                       | --         | --            | --                    | --           | --                     | --           | --  | 7,440                                       |
| Austria                         | --         | --            | --                    | --           | --                     | --           | --  | 195   |
| Belgium                         | 9,550      | 778,000       | 15,700                | 718,000      | --                     | --           | 20,900                                      | 260,000                                     |
| Brazil                          | --         | --            | --                    | --           | --                     | --           | --  | 36,800                                      |
| Canada                          | 66,000     | 3,450,000     | 8,400                 | 349,000      | 2,180                  | 56,400       | 73,000                                      | 828,000                                     |
| China                           | --         | --            | --                    | --           | --                     | --           | --  | 1,250                                       |
| Finland                         | 6,440      | 283,000       | 38,600                | 1,440,000    | 98,800                 | 956,000      | 60,400                                      | 1,010,000                                   |
| France                          | 1,800      | 132,000       | 2,850                 | 261,000      | --                     | --           | 3,860                                       | 33,700                                      |
| Germany                         | 5,350      | 323,000       | 300                   | 26,400       | --                     | --           | 5,570                                       | 84,700                                      |
| Hong Kong                       | --         | --            | --                    | --           | --                     | --           | --  | 500   |
| Japan                           | --         | --            | 1,590                 | 114,000      | --                     | --           | 1,140                                       | 26,700                                      |
| Netherlands                     | --         | --            | --                    | --           | --                     | --           | --  | 5,270                                       |
| Norway                          | 114,000    | 5,730,000     | --                    | --           | --                     | --           | 114,000                                     | 1,380,000                                   |
| Russia                          | 40,200     | 1,790,000     | --                    | --           | --                     | --           | 40,200                                      | 546,000                                     |
| South Africa                    | --         | --            | --                    | --           | --                     | --           | --  | 12,500                                      |
| Spain                           | --         | --            | 744                   | 22,300       | --                     | --           | 536   | 20,700                                      |
| Sweden                          | --         | --            | --                    | --           | --                     | --           | --  | 708   |
| Switzerland                     | --         | --            | --                    | --           | --                     | --           | --  | 960   |
| United Kingdom                  | --         | --            | 2,770                 | 101,000      | --                     | --           | 1,990                                       | 96,400                                      |
| Zaire                           | 13,000     | 695,000       | --                    | --           | --                     | --           | 13,000                                      | 352,000                                     |
| Zambia                          | 90,500     | 3,940,000     | --                    | --           | --                     | --           | 90,500                                      | 982,000                                     |
| Total                           | 347,000    | 17,100,000    | 71,000                | 3,030,000    | 101,000                | 1,010,000    | 425,000                                     | 5,700,000                                   |

XX Not applicable.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Unwrought cobalt, excluding alloys; includes cobalt cathode and cobalt metal powder.

3/ Includes cobalt sulfates, cobalt chlorides, cobalt carbonates, and cobalt acetates.

4/ Customs value.

5/ Estimated from gross weights.

6/ Year to date may include revisions to prior months.

7/ All or part of these data have been referred to the Bureau of the Census for verification.

Source: Bureau of the Census.

TABLE 5  
U.S. IMPORTS FOR CONSUMPTION OF ADDITIONAL COBALT MATERIALS, BY COUNTRY 1/

(Kilograms, gross weight of material, except as noted)

| Period and country<br>of origin | Unwrought<br>cobalt alloys |           | Other cobalt: matte,<br>waste and scrap 2/ |              | Wrought cobalt and<br>cobalt articles |           |
|---------------------------------|----------------------------|-----------|--|--------------|---------------------------------------|-----------|
|                                 | Quantity                   | Value 3/  | Quantity                                   | Value 3/     | Quantity                              | Value 3/  |
| 1995:                           |                            |           |  |              |                                       |           |
| October                         | 10,400                     | \$684,000 | 78,100                                     | \$1,050,000  | 15,400                                | \$813,000 |
| November                        | 4,020                      | 268,000   | 33,500                                     | 444,000      | 11,800                                | 901,000   |
| December                        | 6,440                      | 566,000   | 33,400                                     | 631,000      | 21,200                                | 1,360,000 |
| January-December                | 98,200                     | 5,330,000 | 880,000                                    | 12,400,000   | 155,000                               | 9,760,000 |
| 1996:                           |                            |           |  |              |                                       |           |
| January                         | 5,110                      | 414,000   | 30,600                                     | 452,000      | 10,400                                | 563,000   |
| February                        | 6,560                      | 490,000   | 90,900 4/                                  | 833,000 4/   | 16,000                                | 651,000   |
| March                           | 1,340                      | 107,000   | 71,200                                     | 1,370,000    | 21,800                                | 1,410,000 |
| April                           | 3,940                      | 213,000   | 48,700                                     | 954,000      | 19,000                                | 1,270,000 |
| May                             | 3,940                      | 326,000   | 52,800 4/                                  | 1,880,000 4/ | 19,800                                | 1,270,000 |
| June                            | 2,630                      | 108,000   | 10,900 4/                                  | 396,000 4/   | 13,800                                | 1,070,000 |
| July                            | 4,380                      | 337,000   | 72,300 4/                                  | 2,820,000 4/ | 11,500                                | 824,000   |
| August                          | 8,080                      | 313,000   | 84,700 4/                                  | 2,030,000 4/ | 10,500                                | 676,000   |
| September                       | 2,310                      | 221,000   | 16,800 4/                                  | 875,000 4/   | 12,500                                | 878,000   |
| October:                        |                            |           |  |              |                                       |           |
| Belgium                         | 157 4/                     | 9,430 4/  | 235 4/                                     | 19,200 4/    | --                                    | --        |
| Canada                          | 168 4/                     | 13,800 4/ | 4,820                                      | 59,500       | 628                                   | 75,500    |
| Denmark                         | --                         | --        | 651  | 19,500       | --                                    | --        |
| Finland                         | --                         | --        | 5,400 4/                                   | 388,000 4/   | --                                    | --        |
| France                          | 623 4/                     | 53,700 4/ | 1,140 4/                                   | 29,300 4/    | 1,460                                 | 91,300    |
| Germany                         | --                         | --        | 341  | 12,000       | 2,580                                 | 162,000   |
| Israel                          | --                         | --        | 178  | 5,970        | --                                    | --        |
| Japan                           | --                         | --        | 5,470                                      | 37,600       | 4,320                                 | 244,000   |
| Mexico                          | --                         | --        | --   | --           | 2,720                                 | 107,000   |
| Singapore                       | --                         | --        | --   | --           | 14                                    | 2,270     |
| Sweden                          | 386                        | 20,300    | --   | --           | --                                    | --        |
| United Kingdom                  | --                         | --        | 29,900                                     | 94,900       | 5,730                                 | 339,000   |
| Total                           | 1,330                      | 97,200    | 48,100                                     | 665,000      | 17,500                                | 1,020,000 |

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes other intermediate products of cobalt metallurgy; may include other cobalt-bearing materials from which cobalt is extracted, or from which cobalt-containing chemical compounds are manufactured.

3/ Customs value.

4/ All or part of these data have been referred to the Bureau of the Census for verification.

Source: Bureau of the Census.

TABLE 6  
U.S. EXPORTS OF COBALT MATERIALS 1/

(Kilograms, gross weight of material, except as noted)

|                  | Unwrought cobalt, powders,<br>matte, waste and scrap 2/ |             | Oxides and hydroxides |              | Salts and compounds 3/ |            | Total cobalt<br>content for<br>the month 5/ | Cobalt<br>content,<br>year to<br>date 5/ 6/ |
|------------------|---|-------------|-----------------------|--------------|------------------------|------------|---|---|
|                  | Quantity  | Value 4/    | Quantity              | Value 4/     | Quantity               | Value 4/   |   |   |
| 1995:            |   |             |                       |              |                        |            |   |   |
| October          | 92,900  | \$6,090,000 | 28,200                | \$511,000    | 12,400                 | \$217,000  | 116,000                                     | 1,120,000                                   |
| November         | 72,300  | 3,260,000   | 11,200                | 248,000      | 25,700                 | 416,000    | 86,600                                      | 1,200,000                                   |
| December         | 71,400  | 4,690,000   | 18,600                | 724,000      | 43,200                 | 772,000    | 95,300                                      | 1,300,000                                   |
| January-December | 898,000   | 49,000,000  | 271,000               | 8,850,000    | 860,000                | 7,080,000  | 1,300,000                                   | XX  |
| 1996:            |   |             |                       |              |                        |            |   |   |
| January          | 70,200  | 5,050,000   | 31,300                | 889,000      | 34,500                 | 788,000    | 101,000                                     | 101,000                                     |
| February         | 76,700  | 4,750,000   | 20,200                | 642,000      | 42,000                 | 510,000    | 101,000                                     | 202,000                                     |
| March            | 214,000   | 13,000,000  | 29,100                | 1,070,000    | 336,000                | 318,000    | 316,000                                     | 518,000                                     |
| April            | 168,000   | 9,640,000   | 24,300 7/             | 497,000 7/   | 15,100                 | 132,000    | 189,000                                     | 707,000                                     |
| May              | 145,000   | 6,930,000   | 22,700 7/             | 689,000 7/   | 20,500                 | 346,000    | 166,000                                     | 873,000                                     |
| June             | 159,000   | 7,500,000   | 13,300 7/             | 514,000 7/   | 20,600                 | 310,000    | 173,000                                     | 1,050,000                                   |
| July             | 61,500  | 2,760,000   | 30,100 7/             | 377,000 7/   | 21,200 7/              | 279,000 7/ | 88,300                                      | 1,130,000                                   |
| August           | 88,700  | 3,160,000   | 40,000 7/             | 362,000 7/   | 26,600                 | 292,000    | 124,000                                     | 1,260,000                                   |
| September        | 58,200  | 2,370,000   | 35,600 7/             | 1,060,000 7/ | 47,800 7/              | 231,000 7/ | 95,400                                      | 1,350,000                                   |
| October          | 50,000  | 2,380,000   | 15,900 7/             | 540,000 7/   | 31,900                 | 104,000    | 69,100                                      | 1,420,000                                   |

XX Not applicable.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ May include other intermediate products of cobalt metallurgy, and unwrought cobalt alloys.

3/ Cobalt acetates and cobalt chlorides.

4/ Free alongside ship (f.a.s.) value.

5/ Estimated from gross weights.

6/ Year to date may include revisions to prior months.

7/ All or part of these data have been referred to the Bureau of the Census for verification.

Source: Bureau of the Census.

TABLE 7  
U.S. EXPORTS OF WROUGHT COBALT, COBALT ORE, AND CONCENTRATES 1/

(Kilograms, gross weight of material, except as noted)

| Period and country<br>of origin | Wrought cobalt and<br>cobalt articles |             | Cobalt ore and<br>concentrates |              |
|---------------------------------|---------------------------------------|-------------|--------------------------------|--------------|
|                                 | Quantity                              | Value 2/    | Quantity                       | Value 2/     |
| 1995:                           |                                       |             |                                |              |
| October                         | 41,400                                | \$1,220,000 | 20,000                         | \$59,000     |
| November                        | 40,500                                | 1,930,000   | 50,800                         | 565,000      |
| December                        | 9,070                                 | 682,000     | 1,710                          | 2,700        |
| January-December                | 485,000                               | 17,800,000  | 139,000                        | 1,610,000    |
| 1996:                           |                                       |             |                                |              |
| January                         | 38,800                                | 1,640,000   | 8,050 3/                       | 105,000 3/   |
| February                        | 18,300                                | 1,630,000   | 5,560 3/                       | 337,000 3/   |
| March                           | 24,100                                | 2,060,000   | 10,900 3/                      | 130,000 3/   |
| April                           | 25,400                                | 1,890,000   | 21,700 3/                      | 1,020,000 3/ |
| May                             | 18,800                                | 1,460,000   | 19,300 3/                      | 174,000 3/   |
| June                            | 62,000                                | 2,150,000   | --                             | --           |
| July                            | 28,500                                | 1,170,000   | 13,400 3/                      | 496,000 3/   |
| August                          | 67,100                                | 1,660,000   | 43,500 3/                      | 1,050,000 3/ |
| September                       | 31,000                                | 1,780,000   | 56,200 3/                      | 2,250,000 3/ |
| October                         | 20,600                                | 1,420,000   | 30,900 3/                      | 1,260,000 3/ |

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Free alongside ship (f.a.s.) value.

3/ All or part of these data have been referred to the Bureau of the Census for verification.

Source: Bureau of the Census.